

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions and listings of claims in the application. Applicant has cancelled Claim 3 without prejudice, and amended Claims 1 and 6 in the following, in which added text is underlined and deleted text is stricken through.

1. (Currently Amended) A distance measurement method using ultrasonic, comprising:

transmitting, from a transmitter, an ultrasonic pulse having specific frequencies; receiving, at a receiver, the ultrasonic pulse; and

amplifying the ultrasonic pulse and extracting a specific frequency of the amplified ultrasonic pulse to find an arrival time of a pulse and converting the arrival time into a distance,

wherein the amplifying the ultrasonic pulse and extracting a specific frequency of the amplified ultrasonic pulse to find an arrival time of a pulse and converting the arrival time into a distance includes:

amplifying the received ultrasonic pulse to generate an amplified signal;
filtering the amplified signal to generate a filtered signal in which an unnecessary frequency of the amplified signal is removed or weakened;
amplifying the filtered signal again to generate a re-amplified signal;
converting the re-amplified signal into a digital signal; and
extracting the specific frequency from the converted digital signal through a digital signal processing.

2. (Previously Presented) The distance measurement method as claimed in claim 1, wherein converting the arrival time into the distance includes:

separating the specific frequency of the ultrasonic pulse; and
converting the arrival time of the ultrasonic pulse that is received for the first time into the distance, in a state where the received ultrasonic pulse is mixed with noise having different frequency properties from the specific frequency of the ultrasonic pulse.

3. (Canceled)

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4. (Canceled)

5. (Previously Presented) The distance measurement method as claimed in claim 1, wherein in receiving the ultrasonic pulse, the receiver is a moving object.

6. (Currently Amended) A distance measurement method using ultrasonic, comprising:

setting a first receiver for receiving an ultrasonic pulse at a known position;

setting a second receiver for receiving an ultrasonic pulse at an object to be measured;

transmitting an ultrasonic pulse having a specific frequency;

amplifying the ultrasonic pulse and extracting specific frequencies of the ultrasonic pulse received at the first receiver to find an arrival time of the ultrasonic pulse received at the first receiver and converting the arrival time into a distance;

transmitting error information related to a difference between the distance obtained based on the ultrasonic pulse received by the first receiver and the known distance to the second receiver; and

allowing the second receiver to correct the velocity of sound based on the error information,

wherein the amplifying the ultrasonic pulse and extracting a specific frequency of the amplified ultrasonic pulse to find an arrival time of a pulse and converting the arrival time into a distance includes:

amplifying the received ultrasonic pulse to generate an amplified signal;

filtering the amplified signal to generate a filtered signal in which an unnecessary frequency of the amplified signal is removed or weakened;

amplifying the filtered signal again to generate a re-amplified signal;
converting the re-amplified signal into a digital signal; and

extracting the specific frequency from the converted digital signal through a digital signal processing.

7. (Previously Presented) A distance measurement device using ultrasonic pulse, comprising:

a transmitter configured to generate and transmit an ultrasonic pulse having a specific frequency;

a sensor configured to receive the ultrasonic pulse;

an amplifier configured to amplify the ultrasonic pulse;

an analog filter configured to selectively attenuate other frequencies except for the specific frequency from the ultrasonic pulse amplified by the amplifier, to thereby generate an analog-filtered signal;

a secondary amplifier configured to amplify an analog-filtered signal selected through the analog filter;

an A/D converter configured to convert the amplified analog-filtered signal to a digital data;

a memory configured to store the digital data therein; and

a digital signal processor configured to process the digital data stored in the memory,

wherein a transmission time of a first signal transmitted from the transmitter is received and a delayed time of the first signal is measured based on the transmission time and an arrival time of the first signal calculated in the digital signal processor.

8. (Previously Presented) The distance measurement device using ultrasonic as claimed in claim 7, further comprising:

an output unit configured to display results processed in the digital signal processor;

a numerical input unit configured to inform the digital signal processor of a processing condition; and

a communication unit configured to connect the digital signal processor and an external apparatus to each other so that the digital signal processor and the external apparatus exchange information.

9. (Previously Presented) The distance measurement method as claimed in claim 1, wherein converting the arrival time into the distance includes:

separating the specific frequency of the ultrasonic pulse; and

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converting the arrival time of the ultrasonic pulse that is received in a predetermined time into the distance, in a state where the received ultrasonic pulse is mixed with noise having different frequency properties from the specific frequency of the ultrasonic pulse.